

Claims

1. An air suspension unit consisting of an integrated assembly mountable to an axle of a vehicle, the air suspension unit comprising:
 - an air spring;
 - a height sensor for providing a ride height signal;
 - a valve; and
 - an electronic controller,
wherein the electronic controller is operable for controlling the valve to adjust a volume of air in the air spring in response to the ride height signal from the height sensor.
2. The air suspension unit of claim 1 wherein the air spring comprises a rubber envelope providing a sealed air volume, and the height sensor is mounted within the sealed air volume.
3. The air suspension unit of claim 2, wherein the height sensor is a linear transducer.
4. The air suspension unit of any preceding claim, further comprising a fluid damper.
5. The air suspension unit of claim 4, wherein a rubber envelope of the air spring surrounds at least part of the fluid damper.
6. The air suspension unit of claim 4 or claim 5, further comprising means for changing a path for fluid flow within the damper, thereby facilitating variation in a damping coefficient of the fluid damper.
7. The air suspension unit of claim 6, wherein the means for changing the fluid flow path is controllable by the electronic controller.
8. A vehicle air suspension system comprising a plurality of suspension elements, each element including:

at least one air suspension unit mountable to a vehicle as a single integrated unit comprising an air spring, a height sensor for providing a ride height signal, a valve and an electronic controller; and

at least one fluid damper;

wherein, for each air suspension unit, the electronic controller is operable for controlling the valve to adjust a volume of air in the air spring in response to the ride height signal from the height sensor.

9. The vehicle air suspension system of claim 8, wherein each air suspension unit comprises a fluid damper forming part of the integrated unit.

10. The vehicle air suspension system of claim 8 or claim 9, wherein each suspension element is associated with one wheel of the vehicle.

11. The vehicle air suspension system of claim 8 or claim 9, wherein each suspension element is one associated with each of all four wheels of a four-wheel vehicle, or each of the two rear wheels only.

12. The vehicle air suspension system of any one of claims 8 to 11, wherein each element comprises a single air suspension unit.

13. The vehicle air suspension system of any one of claims 8 to 12, wherein the electronic controller of each air suspension unit is responsive to further signals indicative of prevailing conditions of the vehicle.

14. The vehicle air suspension system of claim 13, wherein the further signals are signals from other air suspension units on the vehicle, for example ride height signals from the other height sensors.

15. The vehicle air suspension system of claim 13 or claim 14, wherein the further signals also include signals indicative of any or all of: vehicle speed; foot brake position; lateral acceleration; engine (running/not running); gear selector position; pressure of air in the air springs.

16. The vehicle air suspension system of any one of claims 13 to 15, wherein the electronic controller receives input signals from push buttons or switches within the vehicle cabin.
17. The air suspension unit of any one of claims 1 to 7, or the vehicle air suspension system of any one of claims 8 to 17, wherein the electronic controller includes a programmable microcontroller.
18. An air suspension unit consisting of an integrated assembly mountable to an axle of a vehicle, the air suspension unit comprising:
 - a fluid damper;
 - an air spring;
 - a height sensor for providing a ride height signal;
 - a valve; and
 - an electronic controller,
wherein the electronic controller is operable for controlling a damping coefficient of said fluid damper and for controlling the valve to adjust a volume of air in the air spring in response to the ride height signal from the height sensor.